

IN THE UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION

FILED

AUG 10 1982

THOMAS CUNNINGHAM, CLERK  
U.S. DISTRICT COURT

THE MAGNAVOX COMPANY, a corporation, )  
and SANDERS ASSOCIATES, INC., a )  
corporation, )  
Plaintiffs, )

vs )  
MATTEL, INC., a corporation, )  
SEARS, ROEBUCK & COMPANY, )  
a corporation, )  
Defendants. )

80 C 4124

DOCKETED

AUG 19 1982

Before The HONORABLE GEORGE N. LEIGHTON,  
Judge

Wednesday, July 7, 1982

2:00 p.m.

The trial was resumed pursuant to recess.

## Present:

MR. THEODORE ANDERSON  
MR. JAMES T. WILLIAMS

MR. GRANGER COOK, JR.,  
MR. EDWARD D. MANZO

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Chandler - direct

1 THE COURT: You may proceed.

2 MR. COOK: Good afternoon, your Honor.

3 I'd like to ask Dr. Chandler to resume the  
4 stand, or since, perhaps, he was in the middle, about to  
5 make a demonstration, I will ask him to proceed with the  
6 demonstration.

7 DAVID P. CHANDLER,  
8 called as a witness by the defendants, having been previously  
9 duly sworn, was examined and testified further as follows:

10 DIRECT EXAMINATION (Resumed)

11 BY THE WITNESS: If I can, I want

12 to say we were about to demonstrate the hockey game.

13 And in doing that, I am taking the cartridge DX-AD-3 and  
14 plugging it into the master component DEX-E-1.

15 I turned on the system, the TV set.

16 We have the overlays, DX-AD-4. Again we have  
17 the title page come up. I will bring up the hockey game  
18 by pushing one of the controls. And in this case we see  
19 a picture of the entire hockey field, the hockey field on the  
20 screen, with the eight players arranged, two in the middle  
21 circle and the others distributed around there ready for  
22 us to play.

23 BY MR. COOK:

24 Q How did the eight players take the ice?

25 A They have all been run out there by the computer.

1 automatically in response to hitting a key on the hand  
2 controller.

3 The action started by moving one of the  
4 players to come in and take charge of the puck. The puck  
5 moves along with the player and can be passed in the same  
6 direction that the player is moving at the time.

7 One of the actions that can happen is pass  
8 it down field. Didn't get very far that time.

9 I can also come up behind a player who has  
10 the puck and knock him down, take the puck away from him  
11 and go off. I may get caught some times. If I do, I have  
12 to go into the penalty box.

13 I got away with it that time. Knocked him  
14 down that time again. Knocked another one down, but he  
15 got up fast.

16 And, of course, the goalie attempts to keep  
17 a puck from getting into the goal as he did just  
18 then as I attempted to shoot.

1 Q How is the goalie motion executed?

2 A The goalie can be controlled a little bit by the  
3 player by using the action buttons on the side where the  
4 goalie can be moved up or down relative to the goal and  
5 do some protecting, but mostly it is controlled by the  
6 computer.

7 Q A whistle just blew and a player left the ice.  
8 What's that?

9 A That happened because the referee saw him knock  
10 a player down and called a penalty and put him off in the  
11 penalty box. He will stay there for a period of time,  
12 which depends somewhat on what the action was and somewhat  
13 a random amount of time. One of the actions that I indi-  
14 cated on Hockey that is true, one of the tests that the  
15 computer imposes once the interaction table indicates the  
16 puck and a player other than the one who has the puck  
17 have come in contact is to check and see if the player  
18 is down and it turns out that's a condition that can be --  
19 it can be demonstrated relatively easily if we can get  
20 the player who has the puck out here somewhere where we get  
21 away from the computer controlled players a bit.

22 You have the puck. Okay, come up away from the  
23 other players somewhere here. I'll come down and knock  
24 you down and go away -- I didn't shoot the puck through  
25 him. Try again. Let's go up here in the corner. Too

1 many people.

2 Here, knock him down. Still didn't shoot it  
3 through.

4 If I can get and shoot it through him there. Went  
5 right through the player that time. I managed to knock  
6 the player down and then come back and shoot the puck  
7 right through the player, and since he was down the computer  
8 wouldn't accept that as a valid situation for an inter-  
9 ception.

10 Q Can you give a demonstration of an actual inter-  
11 ception?

12 A Okay, let's try to get our players out here  
13 where we can do that. Shoot my direction. Didn't make  
14 it there. Not successful. Managed to shoot it too high.

15 One of the other conditions, as you recall, was  
16 if the puck is very far above the feet, it wasn't accepted  
17 and that time I actually went through the player, sent  
18 the puck through the player at a height that was too high  
19 to be acceptable and, in fact, it was not accepted. Let's  
20 get it out here if we can.

21 I succeeded that time in passing it to the  
22 other player, and there was another pass, came back, the  
23 player was standing still. The puck was stopped and just  
24 placed in relationship to the player and it stays put until  
25 such time as I move, move the player by moving the hand

1 controller, and then the puck moves along with the player,  
2 but until that happens, the puck simply stops and is  
3 attached to the player and stays there until other action  
4 comes along.

5 Q Are you finished with the demonstration of Hockey?

6 A I believe so.

7 Q Do you want to proceed with the demonstration  
8 of Basketball.

9 A All right. Basketball. We will be putting  
10 cartridge DX AE-3 into the master component, DX E-1,  
11 and putting the overlays, DX AE-4, into the hand controllers.

Chandler - direct

Again, we have the title page up on the screen, to push one of the buttons, and we now have the full basketball field, basketball court on the screen, and the six basketball players run out onto the court, computer controlled, and take their position with the two centers in the center ring ready to jump and to start the action.

We start the action by pushing one of the buttons and the jump takes place and one of the players has the ball, can dribble any time he is moving, automatically any time he moves.

Each player has a control man. There is a time limit. We ran out, didn't get the shot off soon enough, and so the ball goes over to the other court.

I have the ball now on the right-hand side ready to be thrown. As soon as I am ready to throw it in, I will push a key, throw it to the man that's out here, and now my control man is playing. I can do a shot any time I want to. I shot from way back court in this, as would typically be the case, I didn't get anywhere.

I can go up and guard.

The other team passed, but I intercepted.

Let me see if I can't pass down to one of my players and shoot a goal.

I managed that time to get a pass to a player that was underneath the net, underneath the goal itself.



1 Q Basket?

2 A Basket, that was the word.

3 And shot, and since there is nobody in the place  
4 to be able to intercept it, it was successful in getting it --  
5 backed it in.

6 Now, let's attempt to show one of the situations  
7 that I indicated was one of the tests that the computer  
8 imposes on the situation which there is a detection of the  
9 fact that a ball symbol and a player symbol have interacted.

10 What -- and that one is the one that says  
11 that if the time since the ball has been passed is very short,  
12 the probability of catching it is very low.

13 And so what we will attempt to do in this case  
14 is, as soon as I have thrown the ball in and get it down in  
15 this end of the Court, we will bring the other control man  
16 down to attempt to guard me. The rest of the players  
17 will go down the other court and get out of the road so we  
18 won't have any problem with that. And then I will attempt to  
19 pass the ball with the other player very close, and in all  
20 probability, it could go right on through it. Let's attempt  
21 to do that.

22 Okay, I have the ball down here. The man is  
23 up here. And I will pass through him and it goes right  
24 through him and it is not accepted as a passing situation.

25 One of the other players got it later, but the same time



-1 1 Q Is that an interception?

2 A It is not. One of the other players was farther  
3 away, was allowed to intercept; but the control player it  
4 went right through was not allowed to intercept.

5 Should we try that again?

6 Right through him.

7 So, even though we had the situation in which  
8 the ball image clearly coincided with the image of the  
9 player who would normally be one to be expected to receive  
10 it, since it was up too close, the computer doesn't allow  
11 it to happen.

12 I think that's --

13 Q Do you want to demonstrate an actual interception?

14 A Okay, we should do that, correct.

15 Okay, pass to the middle. There.

16 And there were too many players around, we couldn't  
17 see, but I was standing still; got the ball; and the ball  
18 simply gets attached to the player and stays there, will  
19 not move until we take some action. In this case, the time-  
20 out doesn't permit us to stay there forever. But that's  
21 the time-out action that's independent of interception  
itself.

Shall we try that one again?

Pass down the middle, drop down as you catch it.  
One of the other players got it instead, but the same action

1 took place. The player stood still, got the ball, has  
2 attached to him. I can now run that player around and  
3 when I start running him, he starts dribbling.

4 Q How did you make him run?

5 A By pushing on the key pad and hand controller.  
6 Until I do that, he doesn't move.

7 Q That completes your demonstration?

8 A I believe so.

9 Q With respect to the three accused games, Soccer,  
10 Hockey, Basketball, could you briefly summarize your testi-  
11 mony and what the demonstration showed?

12 A In all three cases, we demonstrated situations  
13 in which a ball or a puck was intercepted by a defensive  
14 control man and if the defensive control man was not being  
15 moved by the hand controller, was standing still, then he  
16 continued to stand still; the ball or puck got attached  
17 to that player and no additional action takes place unless  
18 the hand controller is being actuated, and then the action  
19 is in response to what happens to the hand controller.

20 When the man is moved in response to the hand  
21 controllers, then the ball or the puck moves with him.

2 In the case, in each of the cases there were  
3 conditions that existed that the computer does not allow  
4 as an acceptable interception situation, even though there  
5 has been the interaction between the ball and the object,  
the figure of the man.

1 And in each of those cases we demonstrated  
2 that exception.

3 Q Does anything happen automatically in response to  
4 coincidence?

5 A No, it does not. In all cases there was at least  
6 one and most usually several tests, additional tests imposed  
7 by the computer before any action of any variety takes place  
8 including just stopping the ball.

9 Q Did any of the accused soccer, hockey and basketball  
10 video games embody circuitry for imparting a distinct motion  
11 to a hit symbol upon coincidence?

12 A No, in all cases the motion of the ball or puck is  
13 stopped and attached to the man and nothing more happens.  
14 No motion is involved.

15 Q Do you use the terms "Upon coincidence" and "in  
16 response to coincidence" interchangeably?

17 A Yes, pretty much.

18 Q In your previous testimony when you used the term  
19 "Upon coincidence" did you contemplate either upon coincidence  
20 or in response to coincidence?

21 A Yes, I would interpret that to be the same thing.

22 Q Dr. Chandler, I would like to invite your attention--  
23 THE COURT: Before you leave that am I correct or

24 anywhere near correct that the word "coincidence" and  
25 the word "hit" are synonymous in this case?

MR. COOK: Your Honor, I'm not certain that's correct.

1 The term --

2 THE COURT: Can you ask the witness?

3 MR. COOK: I'm sorry, I didn't know if you were asking  
4 me --

5 THE COURT: If I'm correct, we could leave it like  
6 that, but go ahead.

7 Let me ask Mr. Anderson.

8 MR. ANDERSON: Yes, your Honor, I think for purposes  
9 of --

10 THE COURT: This case?

11 MR. ANDERSON: -- this proceeding to hit is to  
12 coincide.

13 THE COURT: I'm aware of the fact in the English  
14 language they are not synonymous. I'm only asking in  
15 this case.

16 MR. COOK: I would like to have an opportunity to  
17 respond to that, because I do not agree.

18 THE COURT: You do not agree?

19 MR. COOK: No, sir.

20 THE COURT: You tell me, Mr. Anderson, that that's  
1 how the plaintiff understands it, the word "hit" and  
2 the word "coincidence" are synonymous?

MR. ANDERSON: Yes, it is the play of a game and  
you observed what is happening.

THE COURT: All right, I understand.

1 MR. ANDERSON: And that's what occurs in large part.

2 THE COURT: Mr. Cook says he doesn't agree.

MR. COOK: Let me just make an observation or I  
can ask the witness, as you wish.

THE COURT: Sure, go ahead.

MR. COOK: We have used the term "return" to identify  
a motion of the ball in the tennis game. We have used  
the term "hit" generally to describe an action by the  
batter, but the term "hit" as used by Dr. Chandler was  
not being used synonymously with "coincidence."

1 THE COURT: All right.

2 MR. COOK: And that is the reason for the reserva-  
3 tion. I will ask Dr. Chandler to amplify that if  
4 you would like, your Honor.

5 THE COURT: All right.

6 BY MR. COOK:

7 Q Dr. Chandler?

8 A Yes, I would agree with that statement. In the  
9 game of Baseball the term "hit" is generally used for  
10 batting operation. In the actual baseball game, it in  
11 fact does have a ball and bat hit, literally come in contact,  
12 and take place. Of course, that's what we are simulating  
13 on the screen.

14 The issue, though, is not do we create on the  
15 screen something that appears to be a hitting action which we  
16 call hitting because that's what the popular term is for  
17 it. The question is, do we have an actual mechanization  
18 in which we look and see do the spots coincide with each  
19 other and take action in response to that.

20 So it is a mechanization distinction we are  
21 trying to make here and in the case of the baseball, we  
22 do not, and in fact at least most of the time and probably  
23 all of the time there is not actually a coincidence of  
24 the image of the ball and the bat in the process. They  
25 don't actually show up in the same spot.



1 Now, the illusion is that they do and, of course,  
2 that's the illusion we are attempting to create, that the  
3 actual mechanization is not one that depends on coincidence,  
-2 4 and I think we would be inclined to continue to call it a  
5 hit because that's the nomenclature that is used in the  
6 game of baseball, and that's what everybody understands  
7 us to mean when we are talking about a hit, but it is not  
8 based on the actual coincidence and the mechanization we  
9 use is not a coincidence mechanization.

10 THE COURT: All right.

11 BY MR. COOK:

12 Q Dr. Chandler, I would now like to invite your  
13 attention to a discussion of the means, operation and  
14 result of the accused video games comprising specifically  
15 the master component identified as DX E-1 and the accused  
16 games, cartridges identified as DX AA through AF.

17 I would like to invite your attention first of  
18 all to the subject of means. How would you characterize  
19 the television master component with any one of the accused  
20 video game cartridges, DX AA through AF?

21 A I would describe it as a stored program digital  
22 computer system.

3 Q How are the graphics displayed in this system?

4 A They are displayed by a separate display processor  
5 which utilizes information which has been supplied to it by  
a separate game play programmer, processor.

## Chandler - direct

1 Q Where are the patterns for the objects or symbols  
2 stored?

3 A They are stored in graphics RAM or graphics ROM  
4 elements, memory elements in the display processor.

5 Q Please describe the graphics RAM and graphics ROM.

6 A They are memory elements. They are multiple bit  
7 addressable memory devices.

8 Q Where do the patterns for the objects or symbols  
9 originate?

10 A They are provided to the graphics RAM or graphics  
11 ROM from the computer, which is the game play processor.  
12 They either are transferred from the cartridge ROM directly  
13 as patterns in some cases or they are computed by the  
14 display processor in accordance with instructions that are  
15 provided for those computations from the ROM in the cartridge.

16 Q Are the patterns for the objects or symbols  
17 generated by the display processor?

18 A The patterns are not generated by the display  
19 processor, no.

20 Q Is the creation of the object or symbol patterns  
in any way dependent upon raster scan timing signals?

21 A No, they are computed by the game play processor  
or selected from codes available for it, to it, and  
have no relationship at all to what is happening in the  
timing aspect of the display itself.

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Chandler - direct

1 Q How does the display processor know what objects  
2 or symbols to display and where does it display them?

3 A From information that is stored in registers in the  
4 STIC chip and the display processor for the horizontal and  
5 vertical positions and for the addresses in the graphics  
6 RAM or graphics ROM where the patterns are stored for that  
7 display.

8 Q And where does this information come from?

9 A This is provided to the STIC chip by the computer,  
10 the game play processor, and are stored into the registers  
11 within the STIC chips that are set up for storing the  
12 X and Y position and the descriptor word for the starting  
13 address of the patterns in the graphics RAM or graphics ROM.

14 Q Are there game play computations based on software  
15 programs in certain components in the game play processor?

16 A Yes, they are based on programs, a combination of  
17 programs in the cartridge and in the executive ROMS in the  
18 master component.

19 Q Do the software programs and the game cartridge and  
20 the exec ROMS as well as the actuation of the hand controllers  
21 cause information to be supplied to the STIC chip for the  
22 objects or symbols to be displayed?

23 A Yes, that's the only source for them, is the  
24 combination of inputs to the game play processor and its  
25 computations on those to arrive at the information that should

be displayed in presenting it to the display processor.

Q How does the display processor generate the display signals for objects or symbols to be displayed on the screen?

A For the moving objects, which is what we are primarily concerned about, the information is assembled during the horizontal retrace time for each scan line on the TV, for the eight possible lines of object data for that particular line of TV scan and then during the scan time, during the picture time of that scan the horizontal position for each of the moving objects is compared with the position of the scan across the screen and when there is a match between those, then the data for that particular moving object is shifted out of the shift register where that information is stored, and then if there is more than one of those the highest priority object is the one that is displayed at any one particular interval.

1 Q Does computation of desired positions of objects  
2 or symbols on the screen depend on the raster scan timing  
3 signals in any way?

4 A No, this is all done by the game play processor  
5 and it does not use the timing as to position on the screen  
6 at all, in its computations.

7 Q How are game play decisions made with respect  
8 to objects interacting with each other?

9 A There are two general methods that are used.  
10 One of them is a set of computational tests that is  
11 performed by the game play processor on characteristics  
12 of the objects involved.

13 The other method is one in which a combination  
14 of information from the interaction matrix in the STIC  
15 chip, in combination with additional tests imposed by the  
16 computer, are used to determine whether action could take  
17 place or not.

18 Q Of the accused situations, which ones use com-  
19 puter tests alone?

20 A The Tennis game and the batter-bat aspect of  
21 Baseball used.

2 Q Did these two situations you have just identified  
3 use the interaction matrix and STIC chip?

A They do not.

Q Do either of these two situations use a coincidence

1 detection in any way?

2 A They do not.

3 Q Do any of the accused situations use coincidence  
4 detection as a sole basis for effecting the game play?

5 A No, in all cases there are additional tests  
6 imposed on the situation by the computer.

7 Q Are any delay circuits or networks used to deter-  
8 mine the position of objects or symbols or to cause discrete  
9 movement of those objects or symbols?

10 A No, in all cases they are computed.



1 Q Dr. Chandler, now I'd like to invite your attention  
2 to the operation of this accused game system.

3 What produces the X and Y coordinate location  
4 for each movable signal?

5 A The game play processor computes these positions  
6 and supplies that information to the display processor.

7 Q What specific elements are used in this activity?

8 A The game play processor has all of the elements  
9 of a conventional computer with arithmetic logic unit in the  
10 central processor unit, memory, both RAM and ROM, and the  
11 software that's supplied in both the executive and in the  
12 cartridge ROMs carrying out the total functions of a digital  
13 computer.

14 Q Is position information for the symbols to be  
15 displayed generated independent of or dependent on a synchro-  
16 nizing or sync pulses?

17 A It is done completely independently of any  
18 synchronizing pulse information.

19 Q When is position data for the symbols to be  
20 displayed computed?

21 A It can be computed any time, either while the picture  
2 is being displayed or during either horizontal and/or vertical  
3 retrace times.

4 Q What techniques are used to determine the relative  
5 positions of player and ball symbols?

1           A       There are both techniques which are performed by  
2 the computer, in terms of comparing positions or other  
3 conditions that it imposes, and there are also techniques  
4 that utilize the existence of information in the interaction  
5 matrix that suggests that there has been an interaction  
6 between objects and that additional computational tests are  
7 imposed on that information.

8           Q       When is that supplied to the X and Y registers and  
9 the character start address registers in the STIC chip?

10          A       They are supplied only during the vertical retrace  
11 time, which we also have called CPU time.

12          Q       Is the response to coincidence ever automatic?

13          A       No, in none of the accused situations is there  
14 ever automatic response to interaction.

15          Q       How is the motion in a ball symbol including a change  
16 in its direction achieved?

17          A       The computer takes the various pieces of information  
18 it has relative to the situation and computes the position  
19 that it wants the ball or object to be in and supplies that  
20 information to the display processor for it to display.

21          Q       Is the software program utilized in any way in  
22 this activity?

23          A       The software program is the primary controller of  
24 what that set of computations is doing.

1 Q How is the speed of a ball symbol determined?

2 A The computer computes what the speed should be, based  
3 on the algorithms that's been supplied as to what the game  
4 play ground rules are.

5 Q You now used a new term.

6 A It is a computer term that is definition of a  
7 set of functional relationships that are to be mechanized.

8 Q How are the player and the ball symbol patterns  
9 and their positions displayed on the screen?

0 A The display processor utilizes the information  
1 that's supplied to it in its internal registers and in the,  
2 with the pattern data that's furnished in the graphics  
3 ROM or graphics RAM, and creates the signals for present-  
4 ing that picture.

5 Q Are instruction tables used in any way in this  
6 activity?

7 A There are instruction codes within the registers  
8 in the STIC chip itself, which are used to do this from  
9 within the chip. And then, of course, the information that  
0 is stored in the graphics ROM and graphics RAM is data  
1 information that is used as part of that as well.

2 Q How is the hit and hitting symbol motion achieved?

3 A It is computed by the game play processor in  
4 accordance with the rules that are established for the game.

5 And the results of that are converted into

1 position information for the various objects, and that's  
2 supplied to the display processor to be displayed.

3 Q During picture display time, are all player and  
4 ball symbols stationary?

5 A Yes, the only time that any information relative  
6 to a moving object can be changed is during the vertical  
7 retrace time. And so each, during each frame time, the  
8 display processor is strictly displaying a still picture,  
9 a fixed picture.

10 Q Are there separate CPU and STIC modes?

11 A Yes, there are.

12 During the picture display portion of the  
13 vertical scan time, the STIC has charge of the STIC bus,  
14 and that's what we call STIC time.

15 And then during vertical retrace time, the CPU  
16 has access to the STIC bus and we call that CPU time.

17 Q Is any new position data communicated to the  
18 display processor during STIC time?

19 A No, it is not.

20 Q Is position data for the player and ball symbols  
21 introduced to the display processor during CPU time?

22 A That's the only time that it can be presented  
23 to it.

24 Q How do the human hand controls interface with  
25 the accused video game circuits?

1           A     The hand control inputs are coupled into the  
2 computer and it has access to the signals that are coming  
3 from the hand controller when any button or control disc  
4 is pushed.

5                     And then the computer decides what, if anything,  
6 it wants to do relative to that depending on what's  
7 happening in the game play and what the program calls for  
8 for happening.

9           Q     What type of symbols can be displayed?

10          A     The system is capable of displaying complex,  
11 animated objects of several colors.

Q Dr. Chandler, now I'd like to invite your attention to the subject of results.

In a case of football and the fielder-ball action in baseball, what happens to the ball when it is caught?

A It disappears. There is no -- it is eliminated from the moving object mechanization within a system and does not exist any more.

Q Does it disappear from the screen?

A Disappears from the screen, does not exist.

Q As well as from mechanization?

A As well as from mechanization, right.

Q Does it continue to exist as an invisible ball, as an invisible ball?

A No, it does not.

Q Is the ball object deactivated or cancelled?

A Yes.

Q In either of these situations, is a distinct motion imparted to the ball as a result of the ball being caught?

A In both cases, the ball disappears and there is no motion of the ball at that point at all.

Q In either of these situations, does any game play change occur purely as a result of coincidence detection?

A No, the, in all cases there are additional tests



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1 that are imposed by the computer before it even does things  
2 like make the ball disappear.

3 Q In either of these situations, does any subsequent  
4 motion of the ball or the player catching the ball result  
5 from coincidence detection during the process or act of  
6 catching the ball?

7 A No. Once the catching action has taken place  
8 and the ball has disappeared, no additional motion happens  
9 unless it is being controlled to do so from signals from  
10 the hand controller. It can sit still for a very long  
11 period of time without any motion happening and will unless  
12 something is pushed on the hand controller to cause motion  
13 to take place, in which case it then will respond to that.

14 Q What's the case in football?

15 A In the case of football, nothing ever brings the  
16 ball picture back at all.

17 Q In the cases of hockey, soccer and basketball,  
18 what happens when the ball or puck is intercepted by the  
19 defense player?

20 A The ball or puck is stopped and attached to the  
21 player.

22 Q In any of these situations, does any subsequent  
23 motion of the ball or puck or player result from coincidence  
24 detection during interception?

25 A No, the interception process was one in which the

1 ball was stopped and attached to the man and will not move  
2 again unless the man is being moved or subsequently gets  
3 moved by the action from the hand controller.

4 Q Is it clear that in the case of hockey, soccer  
5 and basketball, that in response to actuation of the hand  
6 controllers, the ball or puck can subsequently be passed or  
7 thrown or released?

8 A In all three cases it is possible to pass the ball  
9 or puck in response to action from the hand controller, in  
10 which case a new, a new motion of that ball or puck is  
11 created.

12 Q In any of these situations, is a distinct motion  
13 imparted to the ball or puck as a result of the interception?

14 A No, in all cases it is stopped and there is no motion  
15 of the ball or puck that results from the interception.

16 Q In any of these situations, does any game play  
17 change occur purely as a result of coincidence detection?

18 A In all cases, again the computer imposes additional  
19 tests in addition to having determined the coincidence  
20 information from the interaction matrix. And unless those  
21 additional conditions are satisfied, no change in the  
22 conditions of the game play are imposed.

23 Q Is the answer to my question "Yes"? The question was,  
24 in any of these situations, does any game play change occur  
25 purely as a result of coincidence detection?

1 A And the answer is no to that.

2 MR. COOK: May I have just a moment, your Honor?

3 THE COURT: Yes.

1 BY MR. COOK:

2 Q Now, Dr. Chandler, are any of the nonaccused  
3 video games which we have previously identified considered  
4 to be a thinking game?

5 A Yes, I would say several of them are.

6 MR. ANDERSON: I object. I don't understand  
7 the question. There is no foundation. The terms  
8 are ambiguous, haven't been used before.

9 THE COURT: Well, I said before, Mr. Anderson,  
10 the question is addressed to Dr. Chandler. Do you  
11 understand the question?

12 THE WITNESS: Yes, I do.

13 THE COURT: The objection will be overruled.  
14 You may answer the question.

15 BY MR. COOK:

16 Q Please continue your answer, Dr. Chandler.

17 A Yes, several of them I would classify as  
18 thinking games because the computer is carrying out think-  
19 ing type of computations in the process of carrying out  
20 the game play.

21 Q Would you please identify those games by name.

22 A Well, two that come --

23 MR. ANDERSON: I object, your Honor. I think  
24 this is irrelevant. We have been over this matter  
25 of other games a great deal.

1 THE COURT: He has answered. He says they are.  
2 Now the point is, you want to know which one as among  
3 the six, is that right?

4 MR. COOK: Among the other ones, the nonaccused  
5 ones, your Honor. I'm trying to have him identify  
6 the name of the game, that's all.

7 MR. ANDERSON: This relates to other than the  
8 six games accused, your Honor.

9 THE COURT: No, the objection will be sustained  
10 because -- I think that's enough to be said.  
11 Objection will be sustained. Proceed. I thought  
12 you were asking as among the six accused games.

13 MR. COOK: No, your Honor. I meant to emphasize  
14 the nonaccused aspect.

15 THE COURT: The objection will be sustained.

16 MR. COOK: We have no further questions, your  
17 Honor.

18 THE COURT: All right. Cross examination.

19 CROSS EXAMINATION

20 BY MR. ANDERSON:

21 Q With respect to several of your last answers,  
22 Dr. Chandler, you were asked whether the game play changes  
23 after coincidence, and you said not directly because there  
24 are other tests. Is that essentially what you said?

25 MR. COOK: Well, objection, your Honor. I have

1 no objection to properly characterizing the testimony,  
2 but I think a mischaracterization is highly inappro-  
3 appropriate.

4 THE COURT: The objection is overruled. Proceed.

5 BY THE WITNESS:

6 A Let me restate what I said relative to that.  
7 I am not sure what came through is quite the same.

8 What I said is in no case is there a situation  
9 in which anything results directly from a coincidence  
0 detection. In all cases the computer imposes additional  
1 tests over and above that before any result occurs, is  
2 allowed to occur from that.

3 BY MR. ANDERSON:

4 Q You do agree there is a coincidence detection  
5 in certain of the accused games, is that correct?

6 A Yes.

7 Q And there is a coincidence detection in the  
8 Baseball game when the designated fielder is manipulated  
9 by the human to intercept the ball?

0 A There is a coincidence detection as part of the  
1 process that's involved, yes.

2 Q And there is a means for doing that in the  
3 Mattel game?

4 A There is a means for detecting the fact that  
5 coincidence exists between two objects, yes.



## Chandler - cross

1 Q And the means is at least in part the inter-  
2 action matrix?

3 A Well, interaction matrix is a place in which  
4 the results of that detection are stored. The detection  
5 is, is the detector that indicates that both are happening  
6 simultaneously.

Q I think you said that's in the nature of an AND circuit.

A It is an AND gate or equivalent. What is in there is probably not in fact an AND gate, but it is that function in any event.

Q And that is what Mr. Rush used to detect coincidence also in at least one of the embodiments, isn't it?

A Yes, just like AND gates have been used for every other situation in which you wanted to detect the simultaneous presence of two signals.

Q So it is reasonable then to say that whenever you have referred to detecting interaction it is the same as detecting coincidence in the case of, for example, the fielder, the designated fielder intercepting the ball in baseball?

A Yes, the process of doing the detection by itself is, I would say, the same process. What happens as a result of that is an entirely different situation.

Q And that's also true with respect to soccer, there is a detection of coincidence or interaction by the interaction matrix which is a means for detecting coincidence in the Mattel game?

A Yes, again the interaction matrix doesn't do the detection. The interaction matrix is a storage of the results of such interaction.

Q Along with the AND gate?

A Yes.

Q And that's also true in hockey?

A Yes.

Q There is a coincidence detection of the means for detecting coincidence in hockey?

A Yes.

Q And that's also true in basketball, there is coincidence detection and a means for detecting coincidence in Mattel's basketball game?

A That's right.

Q That's also true in football?

A That's true.

Q Now, after you described that phenomenon and said that there were some other tests, I think Mr. Cook said something like then any change in the play of the game thereafter is not purely, and he used the word "Purely" as a result of coincidence detection, and I think you answered "yes" to that, is that correct?

A Well, I answered in the fashion that says it is not purely a result of --

Q It is not purely the result of coincidence detection?

A That's correct.

Q But there are game play changes that are the result

1 of coincidence detection when you take into account that  
2 there may be some other tests that the game performs?

3 A There are game play changes that result from  
4 coincidence and other things. There are no game play changes  
5 that take place directly as a result of coincidence --  
6 automatically as a result of coincidence.

7 Q Now, in the case of baseball and a fielder where  
8 the human player is moving the fielder in response to  
9 manipulation of his controller, he is trying to catch the  
10 ball and thereby provide coincidence, is that right?

11 A This is baseball you are talking about?

12 Q Baseball.

13 A Yes.

14 Q The designated fielder.

15 A Yes.

16 Q And when that happens, if the fielder is moving,  
17 the ball moves with it, is that correct?

18 A The ball disappears. I have a hard time saying  
19 that that's a ball moving -- there is no ball after intercept-  
20 ion takes place.

1 Q At that point the game is not over, though?

2 A No.

3 Q So the ball is still there?

4 A No, the ball is not there.  
5

## Chandler - cross

1 Q Can you play baseball without a ball, Mr.  
2 Chandler?

3 A Real baseball, you can't. What is actually  
4 mechanized in the system does not have a ball there anymore.

5 Q But both players are fully aware that when that  
6 designated fielder that is manipulated by one of the  
7 players produces coincidence with the ball, that player  
8 changes color and both players know that the ball is with  
9 the player.

10 They are fully aware of that, is that right?

11 A You could say that they were both aware that  
12 that man would be the man you would call the ball carrier.  
13 To say that the ball is there with him, I think you would  
14 have to do some pretty strong interpretation there.

15 Q When that fielder throws the ball, you're saying  
16 the ball just suddenly is created, the play of the game  
17 doesn't assume that the ball has been with him all the  
18 while?

19 A What takes place in the code is a whole new  
20 ball is established. A moving object is set up. A new  
21 ball is created and given a new position and a new set of  
22 velocities that are in accordance with the particular situ-  
23 ation.

24 Q When that happens, how does the game know where  
25 on the whole field to put the new ball?

## Chandler - cross

A Because the ground rules says if that guy is going to throw the ball, it starts out where he is and is given the same coordinates as the ball player.

Q That's because he has had it all the time?

A No, he hasn't had it all the time.

Q Now, with respect to Hockey, there again the coincidence between the puck and the player does produce a game play change of some kind, does it not, after these tests that you speak of?

A Okay. Again, assuming that it has passed all of the rest of the conditions, it has not happened directly as a response to the interaction, but it has happened -- interaction is one of the conditions that is necessary for that to happen.

Q After the interception then, the hockey puck, no matter where it reaches coincidence with the player, it immediately moves down to be attached to a stick, is that right?

A Only if it has reached interaction with the player in a region that is considered an acceptable region for interception. It can actually have interaction with a player and not be an interception at all, but assuming that, in fact, it has reached interception, then it is placed relative to the hockey stick in that case.

1 Q And certainly that's a distinct motion?

2 A It is a placement -- I would not call it a  
3 distinct motion. It is a placement of the ball. It is  
4 put there and left there.  
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1 Q The direction it was moving, the puck was moving  
2 changes and the puck assumes a new direction to go down  
3 and assumes a position on the stick, isn't that what happens?

4 A Well, I wouldn't call it a direction. It is placed  
5 in that place and does not continue to move. It is not a new  
6 motion that is imparted to the ball. It is an action that  
7 takes place. It places the ball in relationship to the puck  
8 and it stays there.

9 Q Now, if that player is in motion the puck assumes  
10 the motion and has that motion imparted to it by the  
11 coincidence, is that right?

12 A I would say it has that motion imparted to it  
13 because a hand control is being activated to require the  
14 player to move, and it moves in response to the signals  
15 from the hand controller as opposed to moving in response  
16 to the interaction.

17 Q But only after coincidence?

18 A It only would happen after coincidence, that  
19 is correct.

20 Q And the same is true with soccer, is it not, no  
21 matter where in the, the sensitive portion of the player,  
22 below his waist, I think you said?

23 A In that case below his waist, yes.

24 Q Becomes effectively the hitting symbol in the  
25 context we are talking about, and if it hits below the waist,



that's coincidence, is that right, if the ball hits below the waist of the player?

A Yes, and assuming that the other -- there are some other conditions that are imposed too, but that's one of the conditions, yes.

Q There are some tests?

A Yes.

Q Like he is on the right team and so forth?

A Things like that, yes.

Q And then the ball also goes down to his foot.

A It goes to his foot and is placed in relationship to the player and stays there, right.

Q And that's a movement from one position to another?

A It is a placement of the object to a different place, does not continue to move. It has not established a new direction or a new motion for the ball.

Q And if the player is in motion, the ball is in motion after coincidence and after these tests that you're talking about?

A That's correct, and again in response, as a result of the fact that the hand controller is providing signals, say, to move the man, so the motion is being created by the signals from the hand controller and if those signals are not there, there is no motion that happens.

Q Now, even if the -- I'm sorry.

1 A I'm sorry, I just cleared my throat.

2 Q Even if the player happens to be standing still  
3 at the time that there is coincidence between the player  
4 and the ball, certainly the ball's motion changes at that  
5 time, doesn't it?

6 A Well, it stops.

7 Q It stops, and wouldn't you say that going from a  
8 rapid motion to a stop is certainly a change in motion?

9 A It is a change in motion, I would have to say that.

10 Q And it is going from a motion of so many pixels  
11 per tick down to a motion of zero, and so that is certainly  
12 a distinct motion, zero motion is very distinct from a rapid  
13 motion.

14 A I guess I'm hung up on the words that talk about  
15 imparting a distinct motion and it -- those words don't say  
16 anything about what the motion was or whether it was a change  
17 in motion and zero motion, I have difficulty calling a  
18 distinct motion. I think that's the distinction I would make.

19 Q I think that takes care of all of the accused games  
20 where the interaction matrix and the AND gate detect  
21 coincidence.

22 A I believe that's right.

23 Q Five cases?

24 A Right.

25 Q So in all of those you recognize that there is a

player controlled symbol, a human controlled symbol that looks like a player or a part of a player and then there is a ball or a puck which is in the nature of the hit symbol in the Rusch patent?

A Yes.

Q And there are means for putting those on the television screen when you are playing a Mattel game and there is means for detecting coincidence between them in the Mattel game?

A Yes.

Q And then our only dispute is, I gather, whether or not stop, going from moving to stopping as one example or moving independently to moving with the player, those constitute imparting a distinct motion?

A I think there is also the issue of whether there is a direct response to the interaction in the -- certainly in the Rusch implementation there was automatic reaction to interaction built into the circuitry and that is not the case in the television system and in fact, even if you interpret computer mechanization as something that needs to be related to that it still does not mechanize an automatic response to the interaction to the coincidence that takes place.

Q So there are these other tests that you mentioned?

A Yes.

Q I did ask you about Basketball also, did I not?

A I don't remember specifically, but certainly it would apply.

Q Let me be sure that I did.

In Basketball, there is also coincidence detection?

A Yes, there is.

Q And after coincidence detection, where the ball is moving through simulated, looks like it is moving through the air, then it immediately goes to the basketball player's hands no matter where it happens to hit him?

A Again, after having passed the rest of the conditions, and there again are a number of conditions that are not automatic, but in the condition in which interception is permitted, then the ball is placed relative to the player, essentially in his hands in this case, and is left there until action is called for from the hand controller for that player.

Q And that certainly is a motion for -- a movement from one place to another?

A It may be and it may not be, depending on where it comes in. Again, the fact that it is placed in a place and not moving when that process is finished says

1 that it is not in motion as a result.

2 Q And after that, then if the player is in motion,  
3 the ball moves with him; in fact, it is also dribbled?

4 A Yes.

5 Q If he is standing still, the motion is just  
6 stopped after it goes, the ball goes to his hands?

7 A That's correct, it is just stopped if he is  
8 standing still, right.

9 Q And again, you agree that's a change in motion,  
10 whether we can agree --

11 A I agree it is a change in motion, yes.

Q Now, with respect to the Tennis game, isn't it a fact that the object of the game in the Mattel Tennis game is to have humans controlling two controllers, each controlling a symbol, to attempt to make it appear on the screen that he has intercepted the ball and hit it back in the opposite direction?

A I think it would be very difficult to have a tennis game that didn't do that. And I don't believe we are talking about a patent on a tennis game. We are talking about a patent on techniques for mechanizing results.

Q But that is the result?

A But that is the result, yes.

THE COURT: By the way, since you asked that question, let me ask one that occurred to me to clarify it.

Do I understand correctly that the six accused games of the defendant Mattel are protected by copyrights?

MR. ANDERSON: I notice a copyright notice. I don't know what that's on. I think Mr. Cook will have to speak to that.

MR. COOK: That's correct, your Honor.

THE COURT: Am I also correct that that master component is not patented? Just because -- it may

Chandler - cross

1 not be of any importance, but I just want --

2 MR. COOK: As I understand it, your Honor, the  
3 mater component is not per se patented, although  
4 there may be various parts of it.

5 THE COURT: There may be some parts in it  
6 which is, I understand.

7 MR. COOK: Yes, a switch or control or something.

8 THE COURT: All right, all right.

9 Let me think about this for a minute.

0 The devices which are accused here are the  
1 six game cartridges?

2 MR. ANDERSON: No, your Honor. It is the master  
3 component. And I was just going to get to that.  
4 It is the master component used in combination with  
5 the game cartridges.

6 THE COURT: The two? The game cartridges and the  
7 master component.

8 MR. ANDERSON: It takes two. I think Dr.  
9 Chandler will confirm that, and he testified, did he  
0 not, that the master component alone without some-  
1 thing plugged into it will do nothing?

2 THE WITNESS: That's correct.

3 MR. ANDERSON: And the cartridge alone will  
4 do nothing?

5 THE WITNESS: Correct.

6 MR. ANDERSON: It takes two to tango?

THE WITNESS: Right.

THE COURT: All right.

MR. ANDERSON: Is there anything else, your Honor?

THE COURT: All right, go ahead.



BY MR. ANDERSON:

Q Now, that's the result that the game seeks, is to produce on the screen in the case of tennis what appears to be two players that are manipulated by two humans, having controllers, and make a ball go back and forth in a competitive situation?

A Yes.

Q And in tennis that's done by Mattel's providing a human controlled hand controller that can move that symbol of a player or a racket left and right and back and forth on a screen, to try to intercept the ball, or to hit the ball, or to have his racket coincide with the ball?

A Yes, I would agree with that, or it would appear to, at least.

Q Or at least to appear to, right.

And so if by chance on the screen it should sometimes appear that the racket doesn't actually coincide with the ball and hit the ball, that would be just a limitation, perhaps, in the design of the game that caused that appearance to occur, is that correct?

A When you say just that, I'm not -- that's a pretty broad statement. We are dealing with an issue of what is mechanized and what that mechanization is. And there are significant differences in that sense. In terms of game play it is a question of what turns out to be effective from

game play standpoint. And most of the time we find it necessary to do things which are not realistic in order to have acceptable game play.

And I don't honestly know what was going through the programmer's mind or his sequence of arriving at this particular one, but we do know what the net, net mechanization was. And we know what that, that implementation turns out to be.

Q Well, you showed us a series of little characters of the tennis player and it showed the tennis player swinging from, I think you said a backhand to a forehand in a series of positions?

A Yes.

Q All across approximately a horizontal plane, neither higher nor lower?

A A little high but not much.

Q And that's the only set of characters that you display, or do you display one where he has the racket up and one where he has the racket down?

A The mechanization is one in which the shape that the man has is immaterial, and there are several different shapes the man can have in that situation. If he happens to be running it is one of the animated pictures of his running sequence. If he is standing still, it is the one that I showed.

And none of the mechanization depends in any way on what the shape of the man is. So, whatever the shape of the man is is immaterial.

The sequence, the five pictures that I showed in terms of the racket position, as I pointed out, are just selected ones in the sequence. There are other intervening ones to get continued motion on through. And that sequence is either the one that I've showed or the same thing where the vertical part of it is downward instead of upward. As we indicated, it is a very small amount of vertical deviation involved.

And that varies depending on the conditions of the play on the court, depending on whether the player is on the right-hand side, left-hand side, the top of the court, bottom of the court; where the ball is coming relative to him. A sequence that's selected which most nearly matches the natural situation.

Again, none of that is used in any of the determination as to whether a return is considered to be, the conditions for return are satisfied. It pays no attention to what the actual picture is in arriving at that conclusion.

Q But the picture is intended to show the hitting of a ball as well as --

A To make believe that it is hitting, yes.

Q -- as the designer would do within the limitations of the hardware and the available memory and so forth?

A Yes.

Chandler - cross

Q Now, then the thing that determines if the ball is hit back or not is whether or not the game determines the racket hit the ball?

A Well, whether the game determines that the conditions that it's established have been satisfied for interpreting it that way.

Q And aren't those conditions that the racket hit the ball, isn't that what the program says, Hit Ball?

A Well, again, I think we would have to say, "hit" is used throughout these things in terms of the vernacular of the game. And I believe that particular sequence was called Hit Ball, that's correct.

Q Do you have that in front of you, by any chance, page 125?

A This is on Tennis that you are talking about?

Q Of the Tennis book.

A I believe this is one in which our numbers may be different.

THE COURT: By "book," you are referring to the source code?

MR. ANDERSON: The source code. It is

Plaintiff's Exhibit 126, I am sorry, I don't know -- it is AF-5, Mr. Williams tells me.

BY THE WITNESS:

A AF-5. This is the one in which our page numbers

## Chandler - cross

are different.

BY MR. ANDERSON:

Q It is, I think, your page 125, is it the page --

A 120 is where we were. It is page 120 in ours.

Q 120, I'm sorry.

Now, the title of that module is Hit Ball, isn't it?

A That's correct.

Q And the function is to decide if contact is made with the ball, as indicated at the top of the page?

A The function is to decide whether that is the simulated condition that we are going to be arriving at for purposes of game play.

Q And it does mean what it says, it is to decide if contact with the ball is made?

A Well, in fact that's not what it does. It does not do that. It does not even ever test whether there's ever been any contact made between the ball and the racket.

As I pointed out, in the sequence I had there, the tests that are imposed are ones that prohibit there ever being any contact between the ball and the racket.

Q Isn't it a fact that it predicts four lines in advance, or whatever it is, that there will be contact with the ball if the racket is swung?

Chandler - cross

A No, in this case, the insistence -- the tests imposed are ones that insist that the path of the ball be one that will not intersect with the racket at all, interestingly enough.

Q But the game so indicates, both visually and in the text of the program, that that's what happens?

MR. COOK: Objection, your Honor.

BY MR. ANDERSON:

Q (Continuing) Is that correct?

MR. COOK: I think you can tell visually from the game that there is no interaction between the racket and the ball. If anything, it looks like a very clumsy attempt, and I don't think you could conclude at all.

MR. ANDERSON: I don't think Mr. Cook's argument in response to my question --

THE COURT: Objection is overruled. Proceed.

BY MR. ANDERSON:

Q Now, isn't it a fact that the reason that you sense when the hitting of the ball is imminent by, I think you said four lines, but I'm not sure, what is the distance from the beginning of the window to the area where the ball will be hit?

A I think you may be confusing this one with a different situation.

Q Maybe I am.

A There is a window that the ball must be within.

Q You showed <sup>in</sup> broken lines, a window in which, relative to the tennis player, in which there will be a sensed contact that will cause the ball to change direction, is that the way that works?

A One the conditions that's imposed after several others have been imposed is to check and see if the ball is within that rectangle. If the ball is not within that rectangle, then we don't consider it a possibility and ignore things and come back and try again in a 20th of a second.

Q And a possibility of hitting it, is that the possibility we are talking about?

A The possibility of establishing ground rules for a return.

Q Now, is there also a timing relationship between

the time of initiation of the swing and the time that the ball reaches some point in its travel toward the player?

A The timing relationship is an indirect one in that when the human player that is controlling this tennis player pushes the button to start his swing, then that initiates a sequence of picture positions for the racket relative to the man, which is a timed sequence.

And that sequence proceeds until it is stopped by either getting completed or by something else happening.

One of the tests that gets imposed after it's passed all of the other tests is to check and see is the horizontal distance between the ball and the man, and it really turns out to be the edge of the box that the man is in; if you want to get very specific about it, when that distance in pixels gets less than the sequence number that's associated with the pictures that are involved, then we say, "Okay, let's call this a situation for returning the ball."

Q Now, you said horizontal distance in terms of pixels, and we are talking along the horizontal length of the screen?

A Yes.

Q There is some small distance out that this is occurring?

A Yes.



Q Do you know how many pixels that is?

A Well, to give you a reference, the width of the block that the men are drawn in over there is eight pixels.

Q Eight pixels is the width of the block?

A The width of the little square that we needed to be in is six pixels, for instance.

Q And as I understand it, the player then causes the racket to swing and the timing of the swing with the arrival of the ball in the window determines whether it is a cross-court or a straight-back or what angle it goes back at?

A That's one of a number of conditions that are taken into account in computing the trajectory of the ball. It is one of those conditions.

Q Now, there is no doubt that that is a distinct motion is there?

A No question about that.

Q And there is no doubt that that distinct motion imparted by the game determining that the ball should reverse direction because of something the player did?

A The combination of those things, including what the player did, yes.

Q And specifically, because it has been decided and it looks like the player is hitting the ball?

A Yes.

Q So the player is hitting the ball, is that right?

A That's the image that is being created.

Q And the game says that the player has hit the ball, whether he has or not and the ball goes off in the other direction?

A Well, I am not sure what you mean about, when you say the game says that. There is nothing in the mechanization that actually says that, but I am not sure that is important either.

Q As the player swings, the ball reverses direction?

A Provided all the conditions are satisfied, yes.

Well, when you say "reverses direction," that's not literally a correct statement either, but --

Q Generally?

A Yes.

Q It is going to the left and now it is going to the right, or vice-versa?

A Yes.

Q It may be going a little up or a little down?

A Or a different speed.

Q Now, 'it is' a fact, I think, that in Tennis the image on the screen has been created so that it looks like you are looking down at 45 degrees onto the court?

A That's correct.

Q So it is quite possible that a ball could pass in front of or behind a player and kind of look like it went through him, but it really went in front of him or behind him; is that what happens?

A That is. It is possible to have that situation occur, that's correct.

Q And isn't that what happened on several of those instances that you described in your testimony, watching the screen? The ball was really in front of or behind the player, the way it looked to me at least.

A I think at least in the one situation in which we had the serve coming from the left side, left-hand of the court and serving to the upper portion of the right end of the court, where we had the ball appearing to go below the player, that was the case in which the ball was actually on this side of the player. And if anything, the three dimensional effect you are talking about should have indicated even more that it was below the player.

So, I think that was one where clearly the, even the three dimensional image is one that would say that that was way below where the player was in the process.

## Chandler - cross

Q Now, with respect to the little portion of the window that's below the tennis player, this little bit in here, is that to take account of this 45-degree angle and three dimensional effect so that a ball that's down in front, as someone is looking down, will be hit, not that it's below his feet or under the surface of the court, but that's just a part of the prospectus?

A Well, it would add to the perspective one direction, take away from it the other. And I don't honestly know what the programmer had in mind at the time that he put that in there. I don't want to speculate on that.

Q You said it was-- arbitrarily shows it?

A I am guessing.

Q --And a subjective matter of how --

A It is typically those things are empirically selected. You try something, you play with it. You see does it give a satisfying result. If it doesn't, you change it until it gives a satisfying result. I don't know if that's the sequence that went through here, but I suspect it was.

Q So it could have been different within the constraints of the game?

A Yes.

Q Could have been a little higher?

A Yes.

Q All right. Now then, I think that we can agree that the Mattel game is designed for use with an ordinary television receiver?

A Yes.

Q It has got an output that goes to the receiver television terminal, the antenna terminal I mean, with a little adapter of some kind?

A Yes.

Q And that's the way Mattel sells it and intends it to be used?

A Yes.

Q Now, you have already said the master component alone has no use, and none of the six accused cartridges have any use alone. You must have <sup>one</sup> of those accused cartridges in the master component to make up the accused combination, is that right?

A Certainly to make up the accused combination that's necessary, since that's the combination that's accused.

Q Right. When that accused combination is put together that way, say tennis plugged into the master component, am I correct that that game is, that is a tennis game, it is nothing else at that time, it can't be used for anything else while that tennis cartridge is plugged in; it is dedicated to playing tennis?

A Yeah. It would be possible to do some other things with it, but in the -- the intent is is that that's what it is supposed to be at that point, yes.

Q Certainly no one sitting in front of his TV set would do anything but play tennis under those conditions.

A I think that's a valid assumption.

Q And certainly the Tennis game does have a player, which in the Rusch patent context is a hitting symbol, do you agree with that?

A Yes, I agree.

Q A tennis player.

A Yes.

Q That's one of the examples he uses in his patent.

A Yes.

Q And it also has means for generating that symbol and putting it on the TV screen, the Mattel game has that.

A That's correct.

Q And it also has a symbol that's a ball, a tennis ball, which is the hit symbol in the context of the Rusch patent.

A Yes.

Q And there is means in the game to place that hit symbol on the screen?

A Yes.

Q And generate that hit symbol?

A That's correct.

Q And move it?

A Yes. The player can't move it, the system can move it, yes.

Q And there is no doubt that there is means in Mattel's Tennis game to impart a distinct motion?

A Yes.

Q To that ball.

A I would agree with that.

Q And it imparts that distinct motion upon the game saying that the ball has been hit?

A If you let -- if you use the word "hit" in a very loose sense of satisfying conditions for the return, if you take it literally in terms of the nature of the mechanization involved, there is not a hitting action that takes place.

Q Now, with respect to Baseball and the ball and bat situation, there is where I think I was thinking of these four lines of, before the ball gets into a certain zone for hitting it. Is that the way that works?

A I think your four comes from looking at the specific details of the software program. There is a line, horizontal line which must be passed by the ball before any consideration of any batting action is considered.

Q So you can't have a hit unless the ball is past that particular point before the bat swings at it?



A Well, not necessarily before the bat swings, but until the ball gets to that point the computer just doesn't consider anything about whether we have a situation for a strike or hit or what-have-you.

Q Now, in that case the game is anticipating that the ball is going to go through the area where it could be hit to enable something that will indicate a hit, is that right?

A I'm not quite sure what you are saying with that question.

Q There is a point at which you are leading where the ball is and determining where it is, determining where it is and it is now within an area where it can be hit by the bat.

A If it were --

Q If you swing.

A If it were a real bat and real swinging, yes, that's true.

Q That's the idea of the game, it looks like a real bat and real swing.

A Again, it wouldn't be baseball if we didn't try to do that.

Q If the player presses his button to swing the bat, it will appear on the screen, at least, that the bat hits the ball.

## Chandler - cross

A That's the appearance that is being created, yes.

Q So the bat there is the hitting symbol of the Rusch patent?

A In relationship to the Rusch patent, that would be called hitting symbol.

Q There is clearly means for putting it there.

A Yes.

Q And the ball is the hitting symbol and there is means for putting that there.

A The hit symbol, the ball would be the hit symbol.

Q I'm sorry, I misspoke, the hit symbol.

And when it appears that the ball was hit by the bat, it imparts a very distinct motion to that ball.

A I would have to agree with that, yes.

Q So apparently the only basis on which you take your position and gave your testimony is that you say that when the bat appears to hit the ball somehow that isn't an ascertainment of coincidence of the bat and ball?

A That is correct. There is no mechanization within the system that in any way attempts to ascertain that there is a coincidence between the ball and the bat.

Q Now, exactly what do you mean by coincidence?

A An actual contact, overlapping of the images, where the one is on top of the other one. That certainly is the mechanization that was used in the Baer and Rusch work. It is the basis for the simplicity of the design that let them get the economical mechanization and without the bat representing something that was detecting an honest to goodness coincidence of the single simultaneous appearance of the signals, their mechanization wouldn't have been possible.

Q I see. So in 1967 or so that was the economical way of mechanizing this game and this procedure.

A It was the economical way of mechanizing the similar things with computers, had been done and was being done and just wasn't economical. It is now economical to do that with computers.

Q It was not economical then?

A It was not economical then.

Q Nobody in their right mind would have proposed a

home TV game that did that.

A Absolutely.

Q So that what Rusch did was do the economical practical thing at the time, is that what you are saying?

A Yes, and I think the distinction as compared to other things that were being done was the distinction of combining this function of sensing the coincidence with the imparting of motions, namely, directly setting memory elements like a flip flop to directly alter the action of the motion of objects and getting back together as a simple answer, I think was a very significant economic situation at the time, but I think we need to recognize that that's what the implication was as opposed to any means at all of making things appear to have had coincidence. It literally was based on honest to goodness coincidence that made that patent valid, made that patent significant.

Q Today with very cheap integrated circuits that are available, one can do a lot more in the way of graphics for the same or less money, is that right?

A Very much so, yes.

Q And also the way in which the game can be enhanced by various appearances and symbols and so forth can be done maybe cheaper than even the more simple approach of Rusch was?

A It is very possible, yes.

Q So it is a very logical thing to incorporate the

hardware, the integrated circuits available today to do the job that Rush did with discrete transistors and so forth in 1967, do you agree with that?

A . Certainly, if you are trying to do the things that they did today, you would use more modern simpler sets of circuitry. It would be very possible to make a micro-processor and mechanize what they mechanized. It would not be very good use of a microprocessor, and we have not done that. What we have done is a far cry from mechanizing that kind of a combination system.

Q Now, I think actually, I noticed in the record what I think was a typographical error. I think you said the first microprocessor you were involved with was an Intel, I-n-t-e-l, 4004.

A Yes.

Q I think the record reads "Mattel 4004."

A That is an incorrect situation in the record.

Q Mattel never developed a microprocessor of its own, is that right?

A Not ever, and certainly not that time frame.

Q Now, when did you first learn of the Intel 4004 approximately?

A This would have been in around 1972.

Q And that was the very first microprocessor?

A That was the first single integrated circuit microprocessor that I'm aware of at least, yes.

Q They just didn't exist before that?

A They just didn't exist before that, right.

Q And when did you do your work with the Fairchild F8 microprocessor?

A That would have been in 1975, '76.

Q As I understand it, you were trying to make a typewriter more automatic and kind of into a word processor by using the newly available microprocessor?

A That particular activity was as a control function

for the mechanism of the printer itself, not related to the word processor field in that particular case.

Q Now, Dr. Chandler, you agreed, I think, that once the Tennis cartridge is plugged into the master component, it is a dedicated Tennis game until the Tennis cartridge is removed and something else is done?

MR. COOK: Objection. There is no definition of "dedicated." I think it might have been used before, but I don't know in what context, your Honor.

THE COURT: The objection is being made to the word "dedicated."

MR. ANDERSON: I think it is a very well known term in this art. I don't mind rephrasing the question, but I would like to have the witness answer it.

THE WITNESS: If you want me to answer it in the --

THE COURT: There is an objection. What is the objection, Mr. Cook?

MR. COOK: The term "dedicated" has not been defined, so that any answer would be uninformative.

THE COURT: I take it it is meant to bring out the fact that once that Tennis cartridge is plugged into the master component, that cartridge is dedicated to the showing of a tennis game. Is that what you

saying?

MR. ANDERSON: Precisely, your Honor.

THE COURT: The objection is overruled.

You may answer.

BY THE WITNESS:

A If you want me to answer this in the context in which the word "dedicated" is used in the video market, I would say "No," it is not a dedicated system, and I say that because the word "dedicated" has come to mean nonprogrammable, noncartridge changeable class of video game and it certainly is not that.

In the sense of at the time of having that game plugged it, what do you do with it, you play tennis.

BY MR. ANDERSON:

Q Then I gather from your definition that the Odyssey I TL200, the 1972 game that you saw demonstrated, was not a dedicated game either, but it had multiple inserts that played different games, is that true?

A Yes, it is a strange mixture between what the industry thinks of as dedicated and programmable games, but in the sense of being able to plug in different modules to change the characteristics of the game, I think you probably would have to call it a programmable game in that sense. It is not programmable in the sense that the term "programmable" was derived from, of being



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able to write new and unpredicted games for it that can be plugged in. That one had a limited set of capabilities and I think we are probably playing on terms that are probably not significant at this point.

Q Well, at any rate, then the difference between the first Odyssey and the Mattel game is not the difference that one is programmable and one is not, it is just the difference that one uses a microprocessor that wasn't available in 1972 or '67 and one, the Mattel game uses that microprocessor.

A Okay, I would agree with the first part of your statement that the significant difference is not because one is programmable and the other is not in the sense that I have defined "programmable game." I think there are a lot of other significant differences between them than just the fact that it uses a microprocessor.

Q When the tennis cartridge is plugged into the master component and is attached to a home owner's TV set and he is using it, there is no way that he can punch in two numbers and add them up?

A That's correct.

Q Now, isn't that the most fundamental conceivable operation of a general purpose computer?

A No, that's an image that sometimes exists, but if you look at what is done with general purpose computers, generally speaking you supply to it a package of software. This package of software may take the form of a stack of cards, as it did typically originally, or it may take the form of a punch paper tape or a, today more likely a floppy

disc or a set of code that is established on a hard disc or some other memory device, but I would say more often than not the big general purpose computers are used with a prepackaged set of software that is fed to it for it to operate on and carry out computations on.

Many computers are set up so that you can go up to a keyboard and punch in a set of numbers and ask it to do things, but that's not necessarily true.

Incidentally, it is very possible to do that with this system, with the keyboard component there. All the keyboard component does is provide the means for having access to that same computer that's in there.

Q I don't want to get into the keyboard, although I will ask you just one question. I think the master component, Mattel's master component sells for around \$230 or something like that, isn't that right?

A Something like that, yes.

Q And the tennis cartridge probably sells for 22 or something like that. Is it correct that that keyboard sells for over \$600?

A In that vicinity. I think it is actually selling for somewhat less than that, but it is significantly more expensive than the master component.

Q And Mattel has sold what, over a million master components, would you say?

MR. COOK: Objection, your Honor. That is certainly outside the scope of the direct and it is certainly unrelated to any of the issues in the lawsuit.

MR. ANDERSON: I'll withdraw the question, your Honor.

THE COURT: Yes.

MR. ANDERSON: I resisted this keyboard business, but the witness volunteered and I felt compelled to try to put that into a proper perspective.

MR. COOK: Your Honor, just for the record, Mr. Anderson seems to have waived any of his earlier objections about the keyboard by virtue of his last question.

THE COURT: I understand you have withdrawn the question.

MR. ANDERSON: Yes, your Honor.

THE COURT: Let's proceed.

BY MR. ANDERSON:

Q In any event, with the master component and any one

of the six accused cartridges assembled in the master component, the home owner cannot add figures together on the Mattel video television game, is that right?

MR. COOK: Objection, your Honor, repetitious. We just went through it a couple of questions before.

MR. ANDERSON: Is that correct?

THE COURT: The objection is overruled. You may answer that question.

BY THE WITNESS:

A Yes, the software that is being supplied to that computer at that stage of the game is not software that lets him manipulate numbers. It would be very possible to put a different cartridge into that master component and let him manipulate numbers, add up numbers. The computer is there.

MR. ANDERSON: I move that that be stricken, your Honor, as not responsive to the question in any sense after the first sentence.

THE COURT: The motion is granted, and put the question again to the witness.

MR. ANDERSON: I would like you to answer just the question.

BY MR. ANDERSON:

Q Is it correct that the home owner who has the Mattel video game, television game comprising one of the accused cartridges and the master component cannot enter two

numbers and cause them to be added up and get an answer on the screen?

A That's correct.

Q Then in no sense could it be said that the master component with one of the accused cartridges in place and adapted and ready to play, say, tennis, could be called a general purpose computer?

A I would not agree with that.

Q You would not agree with it?

A No.

THE COURT: It is now 20 minutes of 4:00. How much longer do you have to go with this witness?

MR. ANDERSON: I would say another hour, your Honor.

THE COURT: Let's take a recess at this point.

(Recess taken.)

BY MR. ANDERSON:

Q Dr. Chandler, before the break we were talking about the master component with an accused cartridge in place, such as Tennis. And you said you considered that a general purpose computer?

A Yes.

Q Now, the homeowner can't program that game in any way when he has it, is that right, to put anything, any new instructions into an instruction register?

A It is still a programmable computer. It happens at that point to be programmed to play tennis, but it is still a programmable computer. Other software can be put into it to do different things, including software that would enable a user to key numbers in and add them up if he wanted to do that.

Q You say it's programmable. We went over that before the break, and the difference, we agreed that Mr. Rusch's first game was a programmable game. And now I am asking you about a general purpose computer.

A But let me --

Q As that term is normally used in the computer industry.

Is it your testimony that the master component with the Tennis cartridge in place is, just as it stands there, a general purpose computer in the sense in which that

term is used in the computer industry?

A It is a general purpose programmable computer. It can be programmed to do different kinds of things, a variety of different things, including things that have nothing to do with game play.

Q But you can't program it without taking out the Tennis cartridge and doing something else to it as it sits there?

A That is typically true of any general purpose computer. At any one time, you have it programmed to do a given thing. While it is doing that thing, unless it is one of the big ones that can do multiple things simultaneously, as some of them can, unless it is one that has that feature, you can't do something else with it until you take that program out and put a different program in.

Q And the different program would be the other games?

A It could be, or it could be a program to do basics, basic language.

Q Is that one of the cartridges that plugs into the master component?

A We don't have any at this point, but the system is very capable of doing that.

Q That doesn't exist?

A It does not exist in the form to work with the master component by itself, at this point.



THE COURT: Before you leave this, Mr. Anderson, why don't you ask Dr. Chandler a question which hasn't been answered. Why don't you ask him whether or not the consumer could reprogram, take one of these cassettes. Isn't that what you asked?

MR. ANDERSON: The Tennis cartridge?

THE COURT: Yes. Can the consumer reprogram the cartridge or can the consumer do that?

As I understand it, someone else can, but not the consumer.

BY MR. ANDERSON:

Q Is it correct that the consumer cannot reprogram the Tennis cartridge or reprogram the game when the Tennis cartridge is in place, doctor?

A Strictly speaking, even that can be done by the consumer, in that what is meant by reprogram is to change the characteristics of a game that's involved. And it is a very simple situation, but it is set up so that if he wants the game to play slowly, he can bring the thing up by pushing the 3 key. And it is a different game in that situation. So that in that sense, it really is programmable by the user.

Q You can press a button to make it play fast or slow, and that's what you mean?

A Well, that's the nature of what programming is.

You put in keys to do things with. That particular one is, happens to have that set of program capabilities in it. And if you really want to be picky about the technicality of programmability, I would say, yes, that one is programmable by the user. I would agree that that's not the same as doing math on it, but that happens not to be what that piece of software is designed to do. It is designed to do something different.

Q And that would not change, if the homeowner pushed the button for fast or slow, that wouldn't change instructions that are stored in the program, is that correct? The program would stay the same?

A It changes some of the instruction words that are used by the computer.

Q That are used?

A Yes.

Q But there are words that are in there; it is just a matter of selecting a different one to speed up the game or slow it down?

A That's also true of any other program, piece of software in any other computer.

Q If it is programmed?

A If it is -- well, they all are.

Q All right. And this one is programmed, this, this game is programmed?

## Chandler - cross

A Yes.

Q And the homeowner cannot change that program, is that correct?

A Well, you are getting into fine technicalities as to use of the word. In the same sense that any other general purpose computer that has a fixed program in it, and they all do, is programmable by the user to do the things within the limitations of the software that's in there, this one can be reprogrammed by the user within the limitations of the software that's been put in it.

Q Are you using the word "program" in the sense of writing a set of instructions, or just in pressing some buttons to alter the play of the games?

A Well, what's the distinction between those? I give it some instructions by pushing keys to have it do things.

Q Call up instructions, don't you?

A Well, if I wrote a basic language set of instructions into a system that has a program in it, that's again what I would be doing. I would be giving it instructions to go call up instructions that are in the system.

I think you are picking at a fine point that -- what we have here is a general purpose computer system. It has all of the elements of a general purpose computer. We can write software for it to do a variety of things that have nothing to do with video games. And in fact, we are in the process of doing that. We don't have any that are out at this point.

Q I am talking only about the tennis game or the six cartridges that are in use with the master component now. I am not talking about the keyboard or anything else.

A I understand. We have --

Q Just six games, the six accused games.

A The important thing is that what we have here is a general purpose computer. That's what we are using as a

1 mechanization for a game play system. And when you have a  
2 specific cartridge plugged into it you have it programmed  
3 for that particular game.

And if you are doing that particular game, you can't do another one until you quit doing that one.

But it is still mechanized with a general purpose computer. And I think that's the important distinction that we need to look at.

Q And the graphic ROM that you referred to that's in the game, that's a graphic ROM for playing games, isn't it?

A It is a graphic ROM which primarily puts up alphanumeric characters. We have a few other patterns in there, but not very many, and very few of them are used so you really could say no, that's a graphics ROM to be used for a calculating type of computer just as well, and in fact we will be doing some of that, using that same graphics capability.

1 Q Dr. Chandler, in playing the games, am I correct  
2 that the one who designed the games decided on a particular  
3 graphic presentation of the game, how they wanted the ball  
4 to look like it moved, how they wanted the players to look  
5 like they moved; and then put into the game certain events  
6 or sequences, or maybe you'd call them instructions, that  
7 would produce those graphic effects on the screen?

8 MR. COOK: Objection, your Honor. I think in the  
9 direct testimony Dr. Chandler indicated while he had  
10 some contact with the programs, he said he was not a  
11 programmer himself. I don't believe there is any basis  
12 in the direct testimony about what was in the minds and  
13 the thoughts of the programmers when they in fact  
14 prepared the program. So I think --

5 THE COURT: Dr. Chandler has been asked questions  
6 on direct about programming. He testified.

7 MR. COOK: Your Honor, he was asked questions that  
were in the source codes and he was obviously testifying  
from those source codes. But he was not asked what  
was in the mind or what was the intent in the head  
or in the thinking of the programmer.

THE COURT: I know that.

MR. COOK: I object on the grounds there is no  
foundation laid.

THE COURT: Do you accept that limitation on Dr.

Chandler's ability to answer your question?

MR. ANDERSON: I certainly will.

THE COURT: All right, the objection will be overruled. You may proceed.

BY MR. ANDERSON:

Q Do you recall the question?

THE COURT: Read the question, the last question, Miss, to Dr. Chandler.

(Question read.)

BY THE WITNESS:

A That's an oversimplified statement of what goes on in the process of programming; but generally speaking, that kind of a process would be typical of the process in arriving at a program.

BY MR. ANDERSON:

Q And was that what was done in writing the tennis program?

A I can only assume, I don't know.

MR. COOK: Well, your Honor, that's quite a problem. If the question is designed to elicit information, factual information, that's one thing. But to have a question asked which requires the witness simply to say, "I can assume," that is not helpful and certainly doesn't add much to the case.

THE COURT: Well, but, Mr. Cook, Dr. Chandler

1 was shown the source book. He testified about the  
2 source book.

3 The objection will be overruled for the reason  
4 I just suggested. He was asked about it on direct.

5 Let's proceed.

6 MR. ANDERSON: Thank you, your Honor.  
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BY MR. ANDERSON:

Q I'd like you again to look at the source book, Plaintiff's Exhibit 126. That is the --

A Which is the Tennis.

Q The Tennis source book. That is the program for the Tennis game cartridge, is that right?

A Yes, this is the source code version of that program for the Tennis game, that is correct.

Q Now, how would the homeowner go about changing this program when the Tennis cartridge is assembled in the master component?

MR. COOK: Your Honor, I am going to object.

BY MR. ANDERSON:

Q (Continuing) In the normal course of using the game?

THE COURT: What is the objection?

MR. COOK: It's outside the scope of the direct examination. There was no testimony on direct examination about changing or modifying the program. I don't think this is relevant to any issue that is really significant in this case, if it is of any significance at all.

THE COURT: I am going to overrule the objection, Mr. Cook, because I thought of the same question. I thought of the same question, because Dr. Chandler

was shown the source book. Now Dr. Chandler has said that he insists that the user or consumer can change the program. I got the distinct impression in Dr. Chandler's direct examination that this source code program listing of Tennis is furnished those who work on the programming of the Tennis game. And I conceived of it in my mind that somebody who knew something about programming a game like Tennis could take this source book and modify the program.

Isn't that what you are trying to establish by asking these sort of questions; to what extent can the user --

MR. ANDERSON: I think it grew out of a question that your Honor actually asked some time ago.

MR. COOK: Your Honor, the user doesn't have access to that program.

THE COURT: I assumed that, because I can't conceive of anybody buying a video game for his home, also getting this complex thing like this. I can't conceive of anybody doing it.

But this whole thing is developed now. We might as well clarify the record about it.

MR. COOK: Your Honor, since you were going to ask the question, I withdraw my objection.

THE COURT: All right. Let's proceed. Go ahead.

THE WITNESS: What was the question again?

(Question read.)

BY THE WITNESS:

A I don't think I ever said or meant to imply that the homeowner could come in and change this code that's in the cartridge. That's not what is done in a big computer system when you go up to it and supply it, your own individual code. There's a whole bunch of software that is in the system that does not change, and the user does not change that.

What I meant by saying that the homeowner can reprogram it is that he has the option of saying, "Today I want this game to be a fast game." And so the ground rules are set up differently for that game than a different time when he does it. And that's a form of programmability of a particular system.

And it is a detail and principle as to whether it is that simple or whether you have provided the user a very complex system that would let him go create a whole new set of codes to put into it, and that's the other extreme of that process. And you can get all stages in between in the process.

BY MR. ANDERSON:

Q Now, with respect to the program, I am looking at page 15 of my copy of the Tennis program, it is the first

page of the ball module, can you find that?

A Yes, I can find that. It is page 105 in our copy.

Q What page?

A 105 in DX AF-5. Did you mean the first page of the code for that module?

Q Yes, where it say "Title, Module for Motion of Ball."

A That's on page 107.

THE COURT: By the way, Mr. Anderson, when you referred to the source code program listing of Tennis as Plaintiff's Exhibit 126?

MR. ANDERSON: Yes, your Honor, it is also Defendants' Exhibit AF-5.

THE COURT: It is also Defendants' Exhibit AF-5, all right. And the page is what, Dr. Chandler?

THE WITNESS: 107.

MR. ANDERSON: 107?

THE WITNESS: Yes.

BY MR. ANDERSON:

Q Now, we have used the term, and I think on direct examination you and Mr. Cook used the term "pixels." I don't think that term was ever defined. Just for the record, what is a pixel?

A Perhaps may not have been. It is a term that

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is an abbreviation from . picture element, is what pixel comes from. And it simply means the smallest picture element that you are dealing with in presenting a picture on the screen.

In our particular case, there are 160 pixels across a screen in the horizontal direction in the active picture portion, and 92 vertically. That gives you the size of the pixel as we have been using it.

Q And does a pixel, 92 pixels vertically, does that have a relationship to the horizontal lines that are scanned by the television receiver?

A Yes, in this case there are two horizontal lines per pixel for the most of what we have been talking about. Actually, some of our objects, our moving objects have the capability of having 192 pixels high, namely, one TV line per pixel in the vertical direction.

Q So any reference to a pixel is a reference to the display on the television receiver?

A And the signals that relate to it, of course.

Q And the signals that relate to it.

A But it comes from the picture on the screen primarily yes.

Q So it is my understanding that in the television receiver there is a beam that is scanning across from left to right and gradually down the screen and you're saying that's broken up into 160 essentially points, although they all run together?

A That's correct.

Q Across the screen.

A There are 160 different places we can change what we are doing in the way of the picture that is being presented both in color and in intensity.

Q And then going down, there are 92 --

A Yes.

Q -- different places, two lines per pixel width that set up the vertical 92 pixels, as you have called them?

A That's correct.

Q And so if you wanted to illuminate pixel 80 in the first line, that would appear in about the middle of the screen, I gather.

A Yes.

Q Or if you wanted to illuminate pixel about 80 in Line 46, that would be -- you would illuminate a spot right about in the middle?

A That's correct.

Q And that's the way a television raster is generated and illuminated to make pictures, I think both you and Dr. Ribbens agreed on that.

A That's correct.

Q Now, when the program says that, as it does here, with respect to the tennis game, that the X velocity and the Y velocity are  $1/32$ nd pixel per tic, does that refer to the velocity that the ball is going to move across the screen in its spots per something, per tic?

A I think you will find that what this is saying is that the units of X velocity in this case are  $1/32$ nd of a pixel per tic and in the course of carrying out the game

play that velocity may be a number of those units.

Q So it might be 10 of those or 20 of those?

A Yes, or 300.

Q Whatever the game happened to call for.

A Yes, correct.

Q And that is directly related to the horizontal and the vertical scanning, where that pixel will be and whether it will move or not, that spot that we are putting a velocity on, is that right?

A Whether it will move or not is strictly a function of the computer in deciding where it wants the pixel to be. At any one time the computer will tell the display processor, "I want that spot to be at Y equals 16 and X equals 35," or whatever it may be, and that's then up to the display processor to go position that spot at that location on the screen, but the computer doesn't pay any attention to timing or anything else, how it gets there. It is looking at a two dimensional coordinate system and saying, "I would like to have this player be at that location in the picture."



Q But that's directly related to timing and you're ultimately going to generate the display.

A It is only when you get to displaying the object, and as we indicated the other day, that is not unique with video games or anything else. That is true of anything that displays on the raster scan TV set, a video camera, a cassette recorder, everything in order to display it on a TV set as to generate a signal ultimately which has a time relationship. The distinction is that none of that is being used as an integral part of the process of deciding where we would like to have our objects be in the system.

That is a completely separate computational process, which is not related to the timing on the screen or anything else. It is related only to X-Y positions.

Q When you decide you want the ball to move five pixels to the left, aren't you saying you want the ball signal to occur five pixels earlier in time compared to the horizontal sync? Isn't that what it is really saying?

A If I'm over here in the game play processor, the computer, deciding what I want to happen in game play, no, that's not what I want. I want it to be that much farther to the left and that's where I want the picture to be.

In order to present a signal that can be displayed on a TV set, the display processor has to take that information and translate that into a relative timing

relationship, because that's the only way to display on a TV set.

Q That's the essence of how these games are displayed and played, isn't it?

A That is the essence of how you make a display onto a TV set, whether it is a video game or a tape recorder or a camera or a pattern, a test pattern generator or anything else that goes into a TV set. That's inherent in displaying on a TV set. There does not need to be any inherent relationship to that kind of timing signals as a part of the process of deciding where you want things to be, and I think that's an important distinction, all of it in the digital computer is completely independent of any timing relationship in the display circuitry.

Q The tick is three frames of the picture or three vertical syncs?

A Yes, normally that is the case. There can be exceptions and the programmer has the option of changing that, but I believe in this case it is in fact three fields, three syncs.

Q The tick that the game program uses in order to make the ball move, for example, is a tick representing three frames or  $1/20$ th of a second, I think, as you said.

A That's correct.

Q And that's a timing tick that is used to display

1 the game that you are playing, make the ball move in response  
2 to the program which is written in terms of pixels per tick,  
3 isn't that right?

4 A As I testified yesterday, that signal has no  
5 significance in relationship to position of objects on the  
6 screen. It is used as a convenient low frequency clock just  
7 for purposes of getting timing of motion of signals. It  
8 isn't important they come from there. It happens to be  
9 convenient they usually do, but there is nothing significant  
10 about the fact that that particular signal is a signal that  
11 is coming from the display processor. It could have just  
12 as well been a separate clock source giving us signals  
13 that are happening every sixtieth of a second to use as a  
14 basic timing signal.

15 Q If that were true it would just happen they would  
16 be the same as the vertical sync?

17 A Or it could be 59 cycles per second. It would  
18 be just as good.

Chandler - cross

Q Just before you get finished before the next vertical sync comes along or the next tic comes along.

A That isn't even necessary. The game play computations in terms of deciding how fast are things moving need a clock of some variety. It does not need to even be synchronized with the display process. The only thing that needs to get synchronized is the ability to communicate with the display processor in the way that we have mechanized this, in that we say the only time we can get in and talk to the system over there is during vertical retrace, but we could very easily have mechanized the system. It wouldn't be at low cost, it wouldn't be as appropriate way to do it, but it would have worked just as well and not change in principle what we have done.

If we had provided a separate clock source that was running nonsynchronously with this clock source and let's say it was running it at 40 cycles a second, or to make life easy, let's get a separate source that is running at 20 cycles a second, since that happens to be what we wind up using mostly, that would have been more convenient for us and simply every time we get ready to put something on the screen we wait until the next time we can get in and talk to the thing and say "This is what we want you to display from now on until we tell you something different."

Q : And the next time you go and talk to it is determined by the vertical sync signal, is that correct?

A That's true only because the display processor is active, creating displays while the active picture is there and the only time that it is possible to get in and talk to it has nothing to do with deciding where is an object, how do we create an object, what does an object look like. Any of the game play computations have no relationship to that at all.

Q So if you use this higher cost, less appropriate, different clock, as you are suggesting you could do, then you would still have to ultimately synchronize the switching between CPU time and STIC time based on the vertical sync signal?

A Purely for communication purposes, for no other reason whatever.

Q And that communication is necessary to play the game. You must communicate the information from the CPU into the STIC to display it on the screen, all of which is controlled by the vertical sync signal, isn't that right?

A But that has nothing to do with position information.

Q Now, isn't it a fact that these velocities and motions of the various symbols, the player symbol and the ball symbol do move at a rate which the programmer or the

Chandler - cross

designer has decided upon in terms of pixels per tick and actually there are pragmatically or I think you suggested subjectively changes in those speeds. For example, in Tennis, as you go into the lower half of the picture, you speed it up a little, speed the ball up just a little bit as it crosses the center line to make it look better, isn't that it?

A It is actually more complex than that. In the case of Tennis, the ball motion is actually computed as a valid gravitationally controlled ball. If you hit a tennis ball up in the air at an angle, it doesn't go in a straight line, it is curved, but because of being pulled down to gravity, the computer in this case is actually computing the trajectory of the ball as if it were a real ball in a real gravitational field.

Q That's not precisely correct, is it, Dr. Chandler, rigorously correct?

A It is precisely correct within the limitations of first the granularity of this one-thirty-second of a pixel in the increment of the velocity and the slight approximation in the formula that was used for what the second order equation is that would be involved for a valid --

Q Yes.

A But that's a typical process in any computer application.

Q But there is no computation of the trajectory or the velocity of the ball in terms of Newtonian physics in this game?

A Yes, there is.

Q It is done in terms of pixels per tick, isn't it?

A Whether it is pixels per tick or feet per second or miles per minute it is all velocity terms and position terms and a tick -- I mean a pixel is every bit as good a distance unit as is inches or centimeters. As a matter of fact, what it really is computed in is units, and this is defined as a unit, as being  $1/32$  of a pixel.

Q And in tennis as the ball crosses the center line, instantaneously the gravity is increased by an increment, is that correct?

A Not because it crosses the center line. Each --

Q But that's what occurred.

A No.

MR. COOK: I think the witness is being interrupted.

MR. ANDERSON: The witness is saying not because --

THE COURT: Don't interrupt the witness.

Dr. Chandler -- if his answer is not responsive, move to strike it and I'll consider it. Had you finished your answer, doctor?

THE WITNESS: I don't believe I did.

THE COURT: Why don't you finish your answer.

THE WITNESS: The velocity is being recomputed every 20th of a second based on the gravitational laws, and it is being done at a very small increment, in fact,  $1/32$  of a pixel kind of an increment and it may take several of those computations to have accumulated enough of a change in velocity so that you can see the difference in what happens on the screen, because that's just the granularity with which the display is being provided. The computations are carried on at a much higher resolution than that and it is done every 20th of a second based on what the trajectory of the ball is and not just changed as it changes the mid court.

MR. ANDERSON: I do move to strike that answer, your Honor, as nonresponsive to the question of whether or not at the midpoint of the course there is a step function change in the number that is used for gravity.

MR. COOK: I think the question was answered, your Honor.

THE COURT: Let me use the formula I usually use in these matters.

Miss Court Reporter, would you please read the question and then read Dr. Chandler's answer. Mr. Cook, you listen to both and we will see whether it is responsive. Proceed.

(Record read.)



Chandler - cross

THE COURT: The motion is granted. The answer is stricken. Dr. Chandler, listen to the question again and answer it. Do you want the question read? Read the question to the witness.

(Question read.)

BY THE WITNESS:

A I don't claim to have digested all of the aspects of this program, so I can't be sure of exact, of all of the exact things that are done in here. There is a taking into account of the three dimensional characteristics of display on the screen so dimensions in pixel form, which is rectangular form for the screen, are different for the front part of the court than they are for the back part of the court as they would relate to what would be happening on a real three dimensional court and the, to be more accurate, in representing that relative change, in principle you should change the scale continuously as the ball goes from front court to back court.

That particular mechanization I have not seen here and I suspect that in fact there is a change in that scale factor, which would be a way of changing -- the gravity would be a way of changing that as it changes mid-course. That's an approximation, as all computations are.

Chandler - cross

Q Just to try to make the record as clear as possible, on page 107 that I had you looking at for the motion of the ball in Tennis, three paragraphs down under "Note on perspectives," there are two numbers, 1 and 2, and 1 says: "Making gravity about one-seventh stronger in front than in back." Does that indicate that that is the way the game is played?

A That would imply that that's what the programmer has done. This particular section is a set of comments and does not represent the code and so seeing it here doesn't necessarily mean that the code corresponds. It probably does, but until we have actually hunted through the code and found the specific code, we cannot be sure of that.

Q And similarly, the next line says, "Making velocities about one-sixteenth greater in front than in back by changing them when the ball crosses the boundary."

That's the same thing. You do something on the screen, you make it look like it speeds up or maybe to make it look right in view of the display on the screen, on the raster scan screen, is that correct?

A That would be correct for the display on the screen. Really, it has no significance as to whether it is a raster scan or not. If it were an XY presentation type of display, it would have exactly the same -- you

have need for the same kind of a change in scale because that has to do with the perspective of the picture that is being drawn, two-dimensional picture. It has nothing to do with the raster scan.

Q But in this particular game, this design that we are charging is an infringement, a tick means three vertical sync pulses?

A That's correct.

Q And these movements are in terms of pixels per tick, which means pixels of movement for every three vertical sync pulses, is that correct?

A That's correct. That's the velocity parameter that is being used in the computation in the system, that's correct.

Q And with respect to use of a tick representing three vertical sync pulses, that is just unique to television receivers or raster scan displays, isn't that correct?

A It would not have to be. It really has to do with the way the display timing is set up and it could have been -- you could have had the same situation if you were doing an Xy type plot. You normally wouldn't, but you could have.

Q There normally isn't a vertical sync pulse?

A That's correct.

Q An XY display -- maybe we should clear that up. There was some testimony earlier about XY displays in your direct examination. You made some reference to monitors. Are you familiar with a television monitor?

A I assume by that you mean a raster scan monitor that does not have a tuner in it to demodulate the RF signal, is that correct?

Q That's what I had in mind, but are you aware of that term?

A That's what the term means to me at least, yes.

Q So a television monitor is a raster scan display that uses usually complete video, but not an RF signal through an antenna and a demodulator, is that your understanding?

A That would be one of the forms it could take, not a complete composite signal as well and still fit that category.

Q You made some reference in your direct examination to, according to my notes, a monitor having an XY display, which you again just referred to, and that's a display that is not raster scan, is that correct?

A That's what the term normally is interpreted to mean.

Q XY means not raster scan?

A Normally, yes.

Q And if such a monitor exists, that would not be a TV monitor or television monitor, that would be something else?

A Yes, that kind of a monitor would not have a raster scan and therefore could not display a raster scan signal. It takes the signal and matches the display device, whatever that might be.

Q It could not be used with the master component with the tennis cartridge in it as you have it here in the courtroom?

A With the display processor we have with the master component, which is designed to go with the raster scan, it could not. It would take a different display processor, but that's all it would take.

Q That would be somewhat of a redesign of a master component, wouldn't it?

A It would take some redesign, yes.

Q Now, in the games that you were demonstrating, sometimes there were multiple players in view, but isn't it correct in all six accused games there is never more than two controlled players controlled by the two controllers and one ball or puck, a hit symbol in all of the games, all of the six accused games?

A That's almost true. In either hockey or soccer I believe it is also possible to do some control of the goalie in addition to controlling a man without moving.

Q Does that occur in response to what you do with your control --

A Yes.

Q -- player?

A No, it is response to controls from a hand controller. It is possible to control two different players in that case, but that's a limited case. Generally what you say is correct.

Q Generally then in all six of the accused games

Chandler - cross

there are two controllers, a left-hand controller and a right-hand controller that is controlled by a human player who watches on the screen and controls a designated figure on the screen that is the control symbol, is that right?

A That's generally correct, yes.

Q And then there is another symbol, the ball or the puck, the hit symbol, that they are trying to manipulate in one way or another?

A To affect the movement in some way.

Q Where there are other figures on the screen other than this one limited case of some control over the goalie, there are not controlled by the player and they are not what you would call player controlled symbols, is that correct?

A Yes. I think in the context in which you are talking that would be a correct statement. The truth of the matter is what you do with the player you are controlling affects what happens to them as well, so there is an indirect control of those players as well, but generally I think what you are trying to say I would agree with.

Q So at least to that extent where there are two controllers, two players on the screen controlled by the humans and a ball or the puck that is moved back and forth, that is like some of the earlier games that we have talked about, with more sophistication I grant you.

MR. COOK: Objection, your Honor, no definition as to the, quote, earlier games that we talked about.

THE COURT: Would you clarify that, Mr. Anderson.

MR. ANDERSON: Sure.



Chandler - cross

BY MR. ANDERSON:

Q To that extent, just to the extent that I have posed the question, is like the Pong game, for example, that you said you were familiar with.

A To the extent that you have stated it, those elements are present in both, that's true.

Q Now, you testified during the trial that you attended the Consumer Electronics Show in June of 1977, I believe.

A That's correct.

Q And I think you said you saw two different chip sets for playing games during that Consumer Electronic Show.

A I said we did. I saw one of them. One of them I did not personally see, but other people from Mattel did see it at this point.

Q You saw the General Instruments'.

A I saw the MOS Technology one.

Q The MOS Technology. Someone else saw the General Instruments'?

A Correct.

Q Now, at that time were you aware of other television games on the market or being offered for sale that used microprocessors?

A Yes, the Fairchild F system was, and I don't

Chandler - cross

remember now whether it was exactly that time, it was in that time frame that it came on the market and I was aware of it.

Q You were aware of it and were you aware of a battery game that was available about that time?

A Yes.

Chandler - cross

Q And were you aware of the RCA game?

A Yes.

Q And they all used the chip set to play the game that included a microprocessor?

A That's correct, yes.

Q And, therefore -- is that what prompted Mattel to get interested in the, their Toy Division, in getting into the television game business?

A No, it was precisely the fact that those systems did not have appealing things in the concepts that Mattel had as to what ought to be there were significantly different. Had they been the same thing, I for one would have argued not to get into the business.

Q And I think you said Mattel finally decided to use the General Instruments' chip set to make a video television game?

A That's correct.

Q I think you indicated that when you first saw the General Instruments' chip set, it wasn't totally satisfactory to you?

A It was unacceptable at that point.

Q And as I understand it, it was unacceptable because you wanted more ability to show different characters on the screen and have a selection of characters and characters of your own generation?

A That was the fundamental problem that existed, yes.

Q And did General Instruments then provide that for you in their chip set?

A Yes, at a later, a few weeks later they came back with some changes to incorporate that.

Q Now, yours, Mattel's was just the suggestion that that be done; Mattel didn't do the engineering, is that correct?

A That's correct. We did a lot of consulting with them on it, but they did the design and -- that was their decision to proceed with it.

Q So just essentially purchased the chip set off the shelf as it were to use in your game?

A Sort of, yes.

Q Just like you might have selected LSIs or ROMs or anything else to make games?

A But in this case, with a lot more influence into what that chip set was. But in principle, basically it was a General Instruments design chip set to fit our requirements which we purchased from them, yes.

Q Now, before General Instruments came out with the chip set for making television games that included a microprocessor, they had other chip sets and chips available for playing television games, did they not?

A That's correct.

Q So this was their latest hardware product to sell to the industry that made video games, and television games?

A The product that they had defined before we started talking with them was that, yes.

Q And when General Instruments sold you the chip set to make your television game, they also provided you with documentation on how to use it and how to program it, how to make it play games, is that correct?

A Basically, yes, that's correct.

Q As far as you know, is the 1610 processor that you referred to as the one that you used in the GI chip set used with any other display processor but the STIC chip that you also use for displaying on television receiver?

A The 16, well, the 1610 is a plastic package version of the 1600 which is the same basic processor. The 1600 was developed as a, as the CPU for a minicomputer that Minneapolis Honeywell built.

And while I have not seen that computer I would assume that it had a display associated with it. So I suspect that it in fact is used with a display. I cannot testify for sure that it was.

Q And that's not the 1610, you didn't have --

A Well, it is the 1600, which is the same processor; it is just a difference of the plastic versus the ceramic package.

Q Are there any other differences that you know of between the 1610 and 1600?

A There were not at the time that we, that the chip set was being decided upon. I suspect that as time goes on, all semiconductors tend to get updated and revised, and I would suspect that there are now some differences, but at that time there were not.

Q Dr. Chandler, in your diagram, Defendants' Exhibit AH-10, you show the output from the STIC chip going directly

into the RF modulator?

A That's not quite the way it works.

This is intentionally a very simplified block diagram to try to encompass the major significance of what's in there.

It is true that there is a color chip between the two that takes the output from the STIC chip and converts it into the actual composite video signal that goes into the modulator.

Q So you gave some testimony about the output of the STIC chip, I think, being five outputs with 16 possibilities?

A Yes.

Q And that, in the color chip, is converted into composite video?

A That's correct.

Q And then the composite video goes to the RF modulator which in turn then puts out a signal that goes directly to the TV antenna to the right of AH-10, is that correct?

A That's correct.

Q You certainly couldn't play a TV game, a television game if you couldn't see the players and see the ball or puck, do you agree?

A We occasionally do, but it is not very satisfactory, I agree.

Q And you must see the interaction in order to play

the game; and you base your swing of the bat or the tennis ball or whatever you do on that visual presentation; you rely on that?

A Generally that would certainly be true.

Q Now, that again requires, that reliance requires in your optical perception of the ball about to be hit by the racket or the bat in acting accordingly, is that correct?

A Or something that you translate into that significance yes.



Chandler - cross

Q Now, you have tended to minimize the horizontal and vertical synchronization signals that are necessary to put a picture on the television screen?

MR. COOK: Objection, that is a mischaracterization. The testimony --

THE COURT: All right. The objection will be sustained.

BY MR. ANDERSON:

Q Dr. Chandler, you can't have a display on a television screen without the vertical and the horizontal signals; isn't that right?

A I think I testified pretty strongly to that effect, that in order to display, you must have those. But that is necessary only for display.

Q And you can't locate the players on the screen in an ordinary television receiver of your game without the horizontal/vertical sync signals?

A The words you are using imply something I would not agree with, at least they apply them to me.

If you say you cannot display an object on the screen without the use of those sync signals, I would agree with that.

If you mean you cannot decide where you want those objects to be without those sync signals, then, yes, you can decide without those sync signals where you want the

Chandler - cross

objects to be.

Q If you can decide where you want them to be, you can't put them there, where you want them to be, without the sync signals?

A That's correct. You cannot actually cause the display to be there, because that's inherent in the television set, as we have said.

Q Now, you have referred to, at one point at least, setting new instructions into the STIC chip. Are there instructions in the usual sense of that term used in the STIC chip?

A I am not sure what you mean by the usual term. If you talk about it being instructions for a general purpose computer, I would say "No," they are not that kind of instructions, because the STIC system is not a general purpose computer. It is a special purpose computer that uses instructions or information from which to carry out the task that it is asked to be doing. And that's the sense in which I was using the word "instructions." It is instructions to the STIC -- to display system, to the STIC chip, to say, "We would like moving object 0 to be located at X equal this and Y equal that, and we would like it to be whose starting address is at such-and such." And that's the kind of instructions that are provided to it.

Q I see. Now, you used that synonymously just now with "information." "Information" is also used synonymously with "data" is that right?

A It many times is. In this case I -- well, you get into semantics as to which way you want to call it. You could call the code for a program information as well.

Q But in this case it is really data that we are talking about that goes into the STIC chip, is it not?

A I don't know that I, that I care which you call it, to tell the truth about it. It is, it is information that has to do with where do we want the STIC chip to go present the pictures on the screen and what pictures do we want presented on the screen.

And if you want to call that instruction to the STIC chip to do that, that satisfies me fine. If you want to call it data as to where the objects should be on the screen, says the same thing to me. But that's what it means in any event.

Q Now, you have testified about the interaction matrix and the AND gate that works with the interaction matrix. Once that AND gate senses coincidence in the Mattel accused games that use the interaction matrix, is it not a fact that there is some dispatch routines that is set that dictates where the ball or puck is going to go and be?

A I am not quite sure what you are saying by that,

Chandler - cross

I guess.

To the extent that the entire program is a program of software that makes decisions, is instructions for making decisions, and this sort of thing, then sometimes, yes, it goes off and does something. Other times it doesn't, depending on what the rest of the conditions are as to what should happen.

There is nothing that automatically happens as a result of that interaction or there being bits set in that interaction table. It is only if the software that's involved elects to go do something with it that it happens.

Q The word is not there, no. The circuit?

A Certainly is.

Q That's your interpretation of the circuitry?

A That's my guess.

Q It is your guess?

A Yes, but I think it's a reasonable guess, that's all.

Q In a circuit that can be of the type that takes a signal

to produce a signal, and you're saying that

it's a circuit that takes a signal

to produce a signal, and you're saying that

it's a circuit that takes a signal

Q Now, you have used that term "automatically" very often. When you say "automatically," you are saying that it must immediately happen without any other possible event; is that what you mean by "automatically," or do you have some other special meaning for the term "automatically"?

A I am really just kind of taking off from what the Rusch and Baer circuitry did. Every time there was a coincidence, it automatically acted, caused things to happen. It is in that sense in which I am using it.

Q Did you find the term "automatically" in the Rusch patent?

A The word is not there, no. The circuitry certainly is.

Q That's your interpretation of the circuitry?

A That's my word, yes.

Q It is your word?

A Yes. But that's what I mean by it, that there is a direct consequence of the interaction taking place.

THE COURT: Mr. Anderson, are you going to finish with Dr. Chandler?

MR. ANDERSON: I don't think I can finish, no, your Honor. We will finish shortly in the morning, though.

THE COURT: All right. We will adjourn then.

Chandler -

We will reconvene at 10:00 o'clock.

In the meantime, Mr. Grice, will you give these envelopes of the in camera, or confidential transcripts to Mr. Cook to look at them? There they are. That's how the court reporter has been giving them to me. You entered an agreement as to what you want done with those pages, how want it handled.

Also, Mr. Grice, will you give these exhibits to Mr. Cook and Mr. Anderson, because those appear to me to be originals. And I think you should keep the originals. I have the copies in the form you furnished them to me. I don't want to mix up these, too. Some of those are defendant's and some of them are plaintiff's.

MR. COOK: Your Honor, as a result of the agreement that counsel have entered into regarding the confidentiality of both the deposition transcripts, the trial transcripts and exhibits, we do not suggest that the Court should not have complete and full access to any of the confidential materials.

THE COURT: However you want to handle it.

MR. ANDERSON: Your Honor, I can just state that we have no desire to have any of this in confidence, obviously. It is strictly up to Mr. Cook.

THE COURT: If you want to let the record show

Chandler -

that you are docketing those with the Clerk so the Clerk can maintain them and keep them in a sealed condition, except insofar as they may be necessary in the making of findings of fact; beyond that, I will just simply keep them right here and at a time that I turn all these documents over to Mr. Grice, they will go to the custody of the Clerk.

MR. COOK: With the full understanding that the Court will have full access at all times.

THE COURT: All right.

MR. COOK: Thank you, your Honor.

MR. ANDERSON: Thank you, your Honor.

THE COURT: We will adjourn until tomorrow morning at 10:00 o'clock.

(At 5:00 p.m. the trial in the above-entitled matter was adjourned to 10:00 a.m. the following day, Thursday, July 8, 1982.)